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Immediate Water Pollution Control Needs Wolf River & Nonconnah Creek, Tennessee & Mississippi, Loosahatchie River, Tenn.

Federal Water Quality Administration, Dallas, Tex

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IMMEDIATE WATER POLLUTION CONTROL NEEDS

WOLF RIVER & NONCONNAH CREEK

TENNESSEE AND MISSISSIPPI

LOOSAHATCHIE RIVER

TENNESSEE

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTH CENTRAL REGION
DALLAS, TEXAS 75202

APRIL 1967

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16. ABSTRACT

The purpose of the report is to focus attention on known sources of pollution in this area and to provide a priority for action to correct existing problems and to prevent future problems.

17. KEY WORDS AND DOCUMENT ANALYSIS

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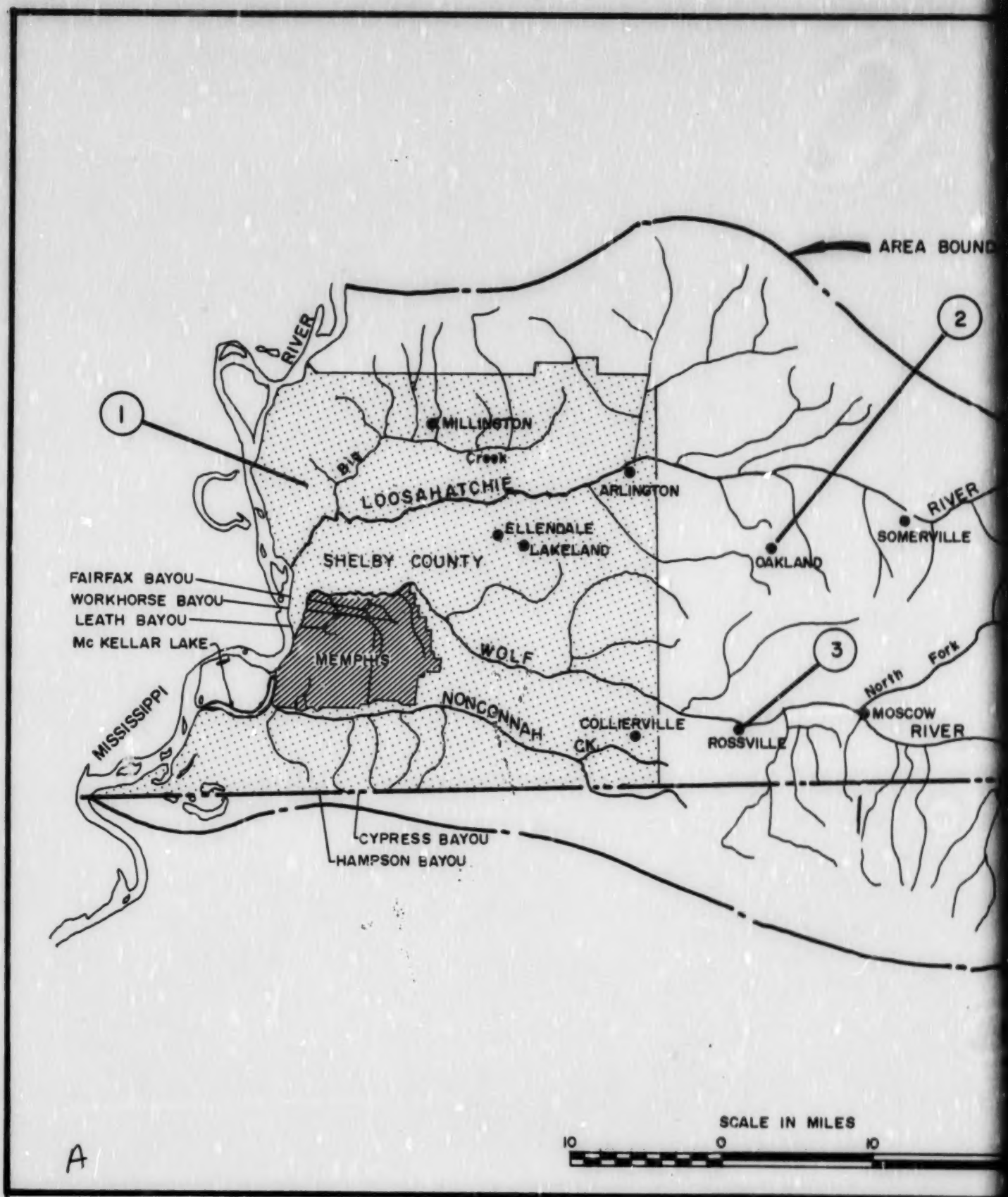
I. Introduction

The purpose of this report is to focus attention on known sources of pollution and to provide a priority for action to correct the existing water pollution problems and prevent future problems in the Wolf River and Nonconnah Creek, interstate streams, and the Loosahatchie River, an intrastate stream (see Figure 1), and their tributaries. This report is based on compilations of available data of the Federal Water Pollution Control Administration, South Central Region, and the state agencies of Tennessee and Mississippi responsible for water pollution control. No detailed water quality surveys or engineering studies were carried out for the preparation of this report.

The findings of this report are based on the best information available at this time on water quality conditions and immediate and potential pollution abatement needs. The omission of any particular town, industry, or other establishment from this report does not imply that an immediate or potential pollution abatement need may not exist in that particular area. Priorities listed are based solely on an evaluation of the Wolf and Loosahatchie Rivers, and the Nonconnah Creek and not on a relative basis with other basins in the South Central Region.

Authority is given in Section 3 (a) of the Federal Water Pollution Control Act, as amended, for the preparation or development of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof and improving the sanitary conditions of surface and underground waters. This report, by describing the immediate needs for controlling water pollution in the Wolf and Loosahatchie Rivers, and the Nonconnah Creek, represents a further step in the development of a comprehensive program to control water pollution in this basin.


AREA BOUND
RIVER
1
2
3
MILLINGTON
Big
Creek
LOOSAHATCHIE
ARLINGTON
ELLENDALE
LAKELAND
SHELBY COUNTY
OAKLAND
SOMERVILLE
RIVER
FAIRFAX BAYOU
WORKHORSE BAYOU
LEATH BAYOU
Mc KELLAR LAKE
MEMPHIS
WOLF
North Fork
MOSCOW
RIVER
MISSISSIPPI
NONCONNAH
COLLIERVILLE
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ROSSVILLE
CYPRESS BAYOU
HAMPSON BAYOU
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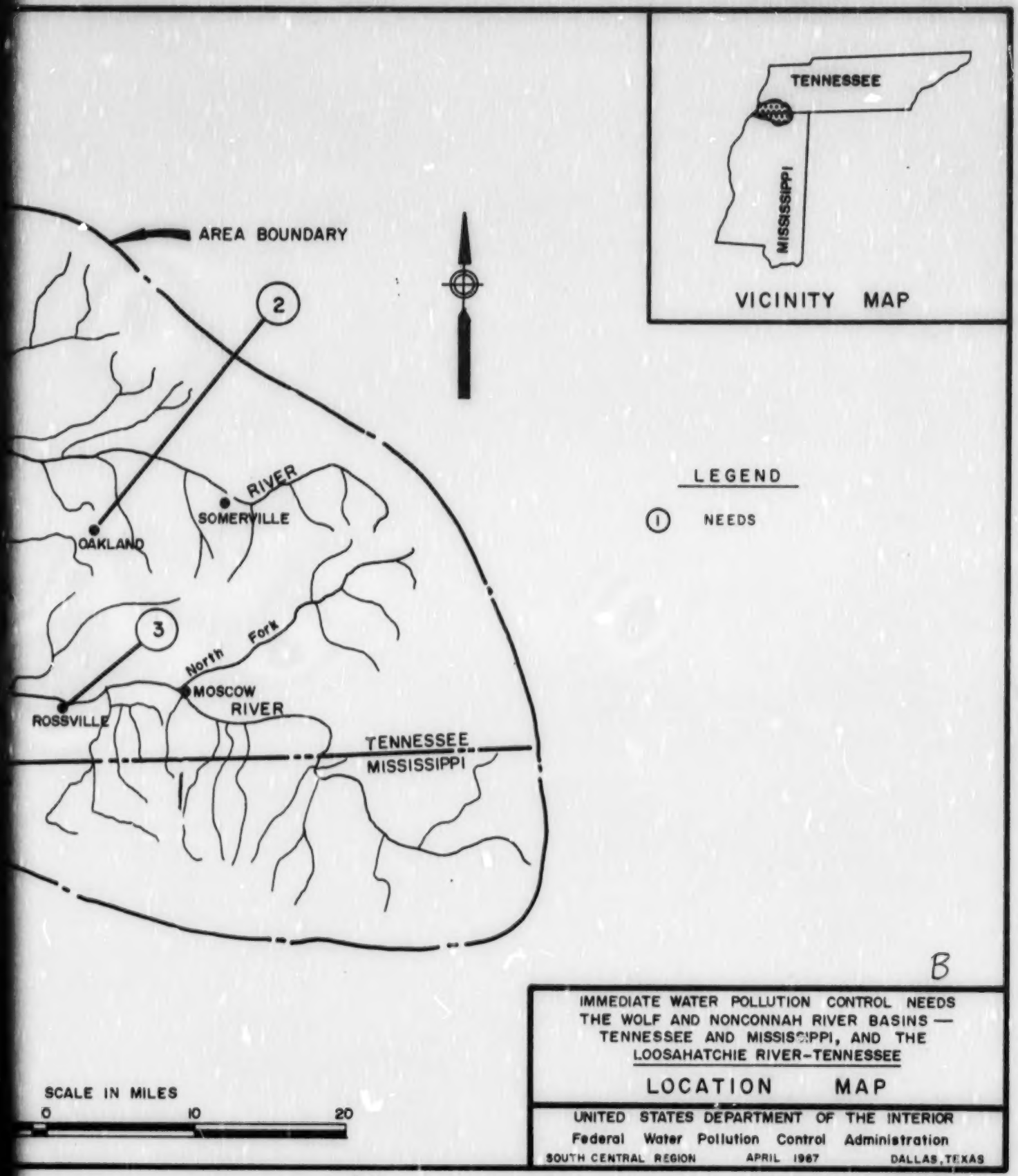

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IMMEDIATE WATER POLLUTION CONTROL NEEDS
THE WOLF AND NONCONNAH RIVER BASINS —
TENNESSEE AND MISSISSIPPI, AND THE
LOOSAHATCHIE RIVER-TENNESSEE

LOCATION MAP

UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
SOUTH CENTRAL REGION APRIL 1967 DALLAS, TEXAS

1-a

FIGURE 1

II. Summary of Immediate Pollution Control Needs

Pollution problems in the Wolf and Loosahatchie Rivers and Nonconnah Creek basins, as indicated by septic conditions, oxygen depletion, presence of toxic materials, and degradation of aesthetics, result in damages to propagation of fish life, municipal and industrial water supply, and recreation uses. The immediate pollution control needs are listed in the following tabulation and grouped into categories: waste treatment, other pollution control and institutional practices. Location designations refer to Figure 1.

Location	Responsibility	Need	Priority
Waste Treatment			
1	City of Memphis - Shelby County, Tenn.	Primary & secondary treatment	A
	City of Memphis & industries in Memphis-Shelby County, Tenn.	Pretreatment of waste, as required, before entering Memphis-Shelby County sewer system.	A
	Industries in Memphis-Shelby County, Tenn.	Treat wastes entering surface streams of basins	A
	U. S. Navy Memphis N.A.S. near Millington, Tennessee	Expand secondary treatment	A
2	City of Oakland, Tenn.	Sanitary sewers, primary & secondary treatment	B
3	City of Rossville, Tenn.	Sanitary sewers, primary & secondary treatment	B

Location	Responsibility	Need	Priority
Institutional Practices			
Basinwide	States of Tenn. & Mississippi	Adopt water quality standards for all interstate and intrastate waters.	A
Basinwide	States of Tenn. & Mississippi	Expand the water quality monitoring network and surveillance program (including treatment plant operation)	A
Basinwide	States of Tenn. & Mississippi	Should consider legislation to provide appropriations for State participation in grants for construction of sewage treatment works.	B
Basinwide	States of Tenn. & Mississippi	Prepare and maintain a complete inventory of industrial wastes not discharged to municipal sewerage systems	B
Basinwide	FWPCA & States of Tennessee & Mississippi	Develop, in cooperation with other interested agencies, a comprehensive water pollution control program for the basin	A
Other Pollution Control Practices			
1	FWPCA & State of Tennessee	Maintain a continuous pesticide monitoring program in Memphis area	A
Basinwide	U.S.D.A.	Regulate use of highly toxic and persistent pesticides for agricultural use.	B

III. Immediate Control Needs

Various measures are needed to control existing and potential pollution of the Wolf and Loosahatchie Rivers and Nonconnah Creek. These measures are needed to reduce the concentration of toxic materials, prevent oxygen depletion, reduce the bacterial density and prevent the degradation of aesthetics in order to improve and preserve water quality for municipal and industrial water supply, propagation of fish and wildlife and recreation.

The actions recommended here, though not all encompassing, are, however, prerequisite to good water quality planning and should be included in local, state, and Federal programming for water pollution control. Background for these immediate needs is summarized in Chapter VI.

Waste Treatment

The City of Memphis and Shelby County should provide treatment facilities for the pollutional wastes now being discharged without adequate treatment via city sewers to the Wolf and Loosahatchie Rivers and Nonconnah Creek (or directly into the Mississippi River). The City of Memphis should require the industries which will use the planned Memphis-Shelby County system to provide pretreatment of those wastes which are not readily handled by normal treatment. These would include certain inorganics, nonbiodegradable organics and/or toxic substances. Those industries which continue to use surface streams for their effluent disposal should provide adequate treatment of their wastes.

There is a need to expand the secondary treatment facilities at the Memphis Naval Air Station, near Millington, Tennessee.

The two other communities in the study area, outside of Shelby County, should provide new or improved treatment facilitiees.

Institutional Practices

To strengthen the states' position on prevention, control and abatement of stream pollution, water quality standards are needed on intrastate streams. State participation is needed in the waste treatment plant construction grants program to accelerate the construction of needed improvements. Increased surveillance and operation inspection of sewage and industrial waste treatment plants are needed to locate and identify existing or potential serious pollution problems. For more rigid control over industrial pollution and aid in solving complex stream quality problems, a complete and

up-to-date inventory is needed of industrial waste discharges to basin streams, listing quantity and quality of effluent and other pertinent data.

Other Pollution Control Practices

The Federal Water Pollution Control Administration in cooperation with the State of Tennesses should maintain a pesticide monitoring program in the Memphis area.

The U. S. Department of Agriculture should regulate the use of highly toxic and/or persistent pesticides for agricultural use.

IV. Costs

The estimated cost of pollution control measures listed in the summary table is shown in the following tabulation:

Item	Estimated Cost
Municipalities	
Memphis-Shelby County sewage treatment plant designed to handle both industrial and municipal discharges (includes cost of waste survey).	$70,000,000
Waste treatment facilities for other municipalities in basin.	50,000
Sub-Total	$70,050,000
Federal installation	305,000
TOTAL	$70,355,000

V. Recent Progress in Pollution Control

The City of Memphis has applied for a $125,000 loan from HUD to finance a study to determine the sewage treatment needs for the city. Consulting engineering firms hired by the city and county are planning a waste survey and sampling program as a basis for designing sewage treatment plants. The Federal Water Pollution Control Administration, in cooperation with the City-County, is presently conducting an industrial waste survey and sampling program of the city's industries to obtain preliminary data in preparation for a more detailed study by the consulting engineers.

The Federal Water Pollution Control Administration has maintained a sampling station on the Wolf River since January 1965 to determine endrin pollution coming from a large pesticide manufacturer. The City of Memphis closed off a sewer line receiving wastes from a pesticide manufacturer and removed large quantities of endrin-laden sludge which posed a continuous threat to the Mississippi River. As a result of the waste monitoring activities of the Federal Water Pollution Control Administration, the pesticide manufacturer has made several improvements in its operations and waste disposal practices which have significantly lowered the endrin load discharged from the plant. There have been no fish kills in the Lower Mississippi River Basin attributable to endrin since these steps were taken.

VI. Background

Pertinent Basin Characteristics

Wolf River Basin

The Wolf River rises in the steep and eroded hills near the western edge of Tippah County, Mississippi. It then flows northwesterly for about 117 miles emptying into the Mississippi River at Memphis, Tennessee. The extreme western portion of the basin is located within the corporate limits of Memphis. The portion of the basin east of Memphis is primarily farmland.

Runoff varies directly with precipitation, with peak flows occurring in the late winter months and early spring. Low flows occur during the summer months with some periods of no flow. The following table showing flow data for the years 1965 and 1966 serve to illustrate the extreme variabilities in flows of this stream.

Flow Data - cfs
Wolf River @ Thomas St. Bridge (Memphis)

Date	High	Low	Mean	Total
1965	18100	95	1124	67448
1966	11200	97	964	61708

Source: U. S. Geological Survey

The periods of extreme low flows are one of the contributing causes of the low water quality; the stream cannot effectively assimilate the heavy industrial and domestic waste loads, particularly in the Memphis area.

Loosahatchie River Basin

The Loosahatchie River rises in the steep hills of Hardeman County, Tennessee. It then flows westerly for about 65 miles across Fayette and Shelby Counties in Tennessee entering the Mississippi River near the north city limits of Memphis. The basin is devoted almost entirely to agriculture with some small land developments for residential, commercial, and industrial purposes.

The river and its tributaries drain an area of approximately 740 square miles.

Runoff varies directly with precipitation with peak flows occurring in the late winter months and early spring. Low flos occur during the summer months with occasional periods of no flow. Flow data for 1965 and 1966 are shown in the following table:

Flow Data - cfs
Loosahatchie River @ Benjestown Road

Date	High	Low	Mean	Total
1965	24300	78	3637	47284
1966	8460	51	1537	24598

Source: U S. Geological Survey

Nonconnah Creek Basin

Nonconnah Creek rises in the southeast corner of Shelby County, Tennessee. It then flows westerly for about 30 miles across Shelby County entering McKellar Lake. The western half of the stream flows through the southern portion of Memphis. The eastern half of the river flows primarily through farmland.

Runoff varies directly with precipitation with peak flows occurring in the late winter months and early spring. Low flows occur during the summer months with some periods of no flow. Pertinent flow data are shown in the following table:

Flow Data - cfs
Nonconnah Creek @ Horn Lake Road (Memphis)

Date	High	Low	Mean	Total
1965	10600	9	882	15000
1966	2248	19	303	3939

Source: U. S. Geological Survey

This overall lack of streamflow is a major cause of the low water quality as the stream cannot effectively assimilate the heavy industrial and domestic waste load, particularly in the Memphis area.

Present Water Quality Problem

The Wolf and Loosahatchie Rivers, prior to their entry into the industrialized area of Shelby County, Tennessee, are of satisfactory quality. Rapid runoff from agricultural lands contribute silt and probably some pesticides but no major problems are indicated. Nonconnah Creek is located almost entirely within Shelby County and serves principally as drainage for this area. The water quality problems of these three streams, such as interference with propagation of fish and recreational uses, are those connected primarily with the discharge of untreated industrial and municipal wastes in the City of Memphis and Shelby County.

Wolf River

Wolf River and its western tributaries - Cypress Creek and Workhouse, Fairfax, and Leath Bayous - receive inadequately treated wastes from fifteen industries. These include food-grade oil processing plants, meat packing plants, a cellulose pulp plant, a paper products manufacturer, fertilizer, roofing, rubber products manufacturers, and a pesticide manufacturer. In addition, an unknown portion of the Memphis sanitary sewage periodically pollutes this river because of overloading and exfiltration from the Wolf River interceptor sewer. These combined wastes containing large quantities of BOD producing substances, toxic inorganic, and organic materials and bacterial loads severely restricting all beneficial uses of the western reach of this stream. Fish kills frequently occur, aesthetics are damaged, recreational uses are precluded, and water suitable for industrial use is limited. The low flow and backwater conditions in this stream result in an accumulation of these wastes in sludge banks and intensify the pollution problems.

Nonconnah Creek

Nonconnah Creek and its Memphis tributary - Hampson Bayou - receive inadequately treated wastes from at least nine industries. Among these are an oil refinery, a textile finishing plant, two cottonseed oil processors, a pesticide formulator, and two metal processors. Discharges from these plants and some exfiltrated

sanitary wastes from the interceptor sewers contain large quantities of BOD producing materials, toxic substances and bacterial loads. These pollutants damage aesthetics, industrial water use, and recreational use of this stream and McKellar Lake - a popular boating and water skiing area - into which it flows before joining the Mississippi River south of Memphis. Low flows and backwater effects from the Mississippi River intensify these pollution problems.

Loosahatchie River

The Loosahatchie River is the least industrialized of the three streams in the Memphis area. Only four major industries are located on its watershed in the study area. These are three chemical plants and a metals separator. The chemical plants produce peroxides, cyanides, ammonia and urea. The metal processor handles chromium and manganese ores. The toxic substances in these wastes degrade the quality of the stream and are a serious threat to the fish and wildlife and recreational uses. The interceptor sewer serving the area also overflows periodically introducing bacterial loads to this stream. As in the Wolf River and Nonconnah Creek low flows and backwater effects periodically intensify the pollution problems.

Other Problems

The Wolf and Loosahatchie Rivers and Nonconnah Creek drain into the Mississippi River, and the inadequately treated wastes contributed, as well as those coming from the Memphis interceptor sewers, are a constant threat to the downstream water uses of the Mississippi and Atchafalaya Rivers. One series of major fish kills in 1963-64 in these streams in Louisiana have been attributed to the pesticide endrin, coming in part, from a pesticide manufacturer in the Memphis area.

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